"The Future Is Behind Them!": Post-Apocalypse and the Enduring Nuclear in Post-Soviet Russian Fiction

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A powerful monologue in Svetlana Alexievich's polyphonic oral history, *Voices from Chernobyl*, captures the crisis of representation that surrounds nuclear disaster. Journalist Anatoly Shimanskiy reflects on the impossibility of writing about Chernobyl when his consciousness can't fathom the long temporality of radioactive decay or imagine a future when anthropogenic radiation will no longer affect people and environments: "Beyond that my consciousness couldn't go. I couldn't even understand anymore: what is time? Where am I? To write about that now, when only ten years have gone by. Write about it? I think it's senseless. You can't explain it, you can't understand it." He concludes, "Show me a fantasy novel about Chernobyl- there isn't one! Because reality is more fantastic."[1] Paradoxically, what Eliot Borenstein has called the "Chernobyl model" of nuclear catastrophe looms large in post-Soviet Russian literary imaginations of the future, most prominent in twenty-first century post-catastrophic speculative fiction.[2] The giant Russian publishing house EKSMO features an entire series entitled "Russian Apocalypse" of doomsday novels set in post-apocalyptic worlds devastated by atomic war, including Viktor Glumov's *Death City* (2012), Arytom Michurin's *Food and Ammunition: The Renegade* (2012), Viacheslav Khvatov's *Atomic Autumn* (2012), and Oleg Kulagin's *Russian Dawn* (2011).[3]

In all these texts, a wounded male hero fights against Manichean forces in a hostile environment, his survival guaranteed by his "will to kill."[4] However, the nuclear events that are their *raison d'être* occur offstage or in the historical past. The nuclear is conceived as an invisible threshold event, a zone of alienation, or as a durable catastrophe only perceptible in its transgenerational effects over the longue durée, as in the case of the long history of genetic "Consequences," uncanny metamorphoses of hybrid human-animals, and eternally prolonged lifetimes of Oldeners after an atomic "Blast" in Tatyana Tolstaya's *The Slynx,* or the mutated lifeforms and posthuman species evolving after global atomic war in Dmitry Glukhovsky's *Metro 2033.* This chapter explores generic and ideological contradictions in the post-catastrophist imaginary of the nuclear, using *Metro 2033* as a paradigmatic example of post-Soviet Russian speculative fiction, and examines the political implications of the transmedial refashioning of Glukovsky's novel for mass consumption within international video game markets as a post-apocalyptic first person shooter (FPS). I will focus on the concept of the "enduring nuclear," which indicates on one hand the long, seemingly imperceptible temporalities of radioactive decay and the "slow violence" of nuclear disaster,[5] but which also alludes to the ways in which the post-catastrophic genre is bound up with a sense of impossible or blocked futurity, resulting in the contradiction that speculative post-Soviet fictions such as *Metro 2033*, while post-apocalyptic, seem incapable of imagining a transition to a post-nuclear modernity.

If a central task of energy humanities critics is to ask, "Who gets to imagine energy futures?"[6] comparative literary topographies are essential to the formulation of a nuclear energy humanities. A world-literary approach to nuclear environmental criticism should uncover not only imaginaries corresponding to British and American nuclear culture and the dominance of the US imperium, but also on the enduring nuclear futures imagined in post-Soviet Russia and other global contexts of nuclear development in the twenty-first century, such as China, India, and Iran. The globalization of the nuclear can be mapped "through the trace of militarized radiation."[7] Our capitalist nuclear modernity is above all a global modernity– singular, planetary, and world-historical –in which all forms of earthly life have been altered by the atmospheric effects of nuclear development, as Joseph Masco observes:

> There have been thousands of nuclear explosions conducted in test sites around the world—deliver[ing] vast amounts of radioactive materials into the global biosphere. Taken up by global wind currents as well as plants and animals, these materials were delivered into each and every person on the planet and deposited in varying amounts within their genomes. As a result, all of us carry in our bodies traces of Strontium-90 and other human-made radioactive elements from the nuclear test program, making life on planet Earth quite literally a post-nuclear formation.[8]

If we live in a post-nuclear formation, in the sense of occupying a planet where the genomic and geophysical mutations unleashed by nuclear disasters and warfare will continue to unfold over temporalities that exceed individual human life-times, we do not live in a post-nuclear age in the sense of having abandoned nuclear energy regimes or weapons systems. The "amazing political flexibility of nuclear exceptionalism" lingers into the twenty-first century, long after its emergence in the post-war discourses of cold warriors.[9] The 'nuclear state' persists as a marker of modernity, in which geopolitical status is gauged in proportionate to the number of nuclear missiles owned and the capacity to process nuclear waste, while the lack of weapons of mass destruction is a sign of 'backwardness.'

In twenty-first century Russia, energy regimes have been central to the symbolic and material constitution of the post-Soviet nation as an enduringly nuclear state. In the decade from 2001-2011, the term nuclear renaissance was used throughout the global nuclear industry to refer to a hoped-for revival of nuclear power, which experts imagined would be driven by Euro-American countries building new reactors in the attempt to reduce greenhouse gas emission limits and escape rising prices of fossil fuels, as well as the expansion of nuclear programmes in rising nations such as China and India. In Russia, Putin's administration removed barriers to the expansion of the nuclear industry by dismantling expert assessments and regulations, extending the licenses of the oldest and dangerous reactor models, including the RMKS and VVER-440 even after their planned operational lifetimes had finished, and setting three major goals for Rosatom, the state-owned nuclear corporation: to increase nuclear contribution to electricity generation by 30% in 2030 by building 40 new reactors; to continue 'sustainable' development of the nuclear weapons complex; and to expand into the international capitalist market of nuclear technology by selling products and services such as the reprocessing of imported nuclear waste and the construction of reactors for China, India, and Belarus.[10] An inherent tension between the conception of nuclear power as *energy* or as *weaponry* characterizes the historical development of nuclear technology, where the concept of the nuclear as "safe" or "destructive" energy depends on the rate of fission.[11] If a hallmark of the U.S.S.R.'s hegemony as a 'Great Power' was its "atomic communism,"[12] grounded in monopoly of enormous uranium reserves and the construction of weapons of mass destruction, then a nuclear energy renaissance in post-Soviet Russia would symbolically reaffirm its geopolitical dominance as a thoroughly 'nuclear state' even after the loss of its Soviet territories: *Derzhava* founded on nuclear power, this time that of energy and market-power.

In 2011, however, the disaster at the Daiichi nuclear power plant in Fukushima, Japan exposed the global nuclear industry to renewed critique, undermining its claims to be a "clean," "safe" alternative to fossil fuels and leading energy-consuming nations to reconsider their plans for expansion. Russia's nuclear aspirations similarly faltered, encountering concerted protests from environmental groups in over 20 cities where the proposed new plants were to be constructed, and failing to raise sufficient capital investment or heavy machinery capacity to build new reactors, with the result that the number of new plants was cut by 60%, leading WISE to conclude: "The Russian 'nuclear renaissance' may well be over, even before it started. And this is good news because reactors are expensive, inefficient and dangerous, just as they were 24 years ago when Chernobyl happened."[13] Indeed, the econationalist movements prompted by the breach in the core reactor of the Chernobyl power plant in 1986 were instrumental in helping to bring about the collapse of the Soviet Union, dislodging "the discourses of benevolent technology, scientism, and 'humane' progress that been central to Soviet identity" and demanding that the nuclear state account for its catastrophic legacy of "profound damage to ecosystems and public health."[14] However aspirational, Russia's resurgent nuclear ambitions in the twenty-first century demonstrate the ideological contradictions of the nuclear ontologies persisting in post-cold war geopolitics, as well as the ways in which public imaginaries of energy futures can be swiftly renegotiated in contexts of nuclear emergency and environmental pressure from below.

Post-Soviet Russian literature is haunted by nuclear disasters and ecological catastrophes, which most critics have read as allegorizing the trauma of the geopolitical collapse of the U.S.S.R. and the violence of the transition from a sovereign socialist state to a capitalist economy. Apocalyptic frameworks have a peculiar charge in post-Soviet fiction, employing a "cyclical model of history" that establishes the dystopian future as "a repetition of a familiar past"[15] and capturing the sense of a paradoxically doubled temporality where the category of future seems to have "reversed its interpretational vector" so that "the Russian present is no longer interpreted in terms of the great future to come, but in terms of what happened (and failed)."[16] As Alexei Penzin observes, at the core of the post-Soviet lifeworld is a "post-shock subjectivity produced through brutal processes of primitive accumulation in the 1990s," of which a key moment is the "privatization of oil and gas resources, intertwined with massive violence and social processes that were aimed at reshaping subjectivity according to the demands of profitability and the market."[17] The post-apocalyptic carries a register of post-imperial melancholy, bound up with nostalgia for the two million square miles of lost Soviet territories. However, the explicitly environmental content of these fictions has less often been taken literally, interpreted not only as allegory of the trauma of ideological transition and betrayal of the bright Soviet future, but as mediating the historical legacies of the nuclear disasters of the Soviet period and the new forms of ecological crisis unleashed by post-Soviet neoliberalization.

The energy regimes of oil and nuclear power have a peculiar salience in contemporary Russian fiction corresponding to the energy ontologies and regimes shaping the formation of the post-Soviet state. J.R. McNeill defines energy regimes as 'the collection of arrangements whereby energy is harvested from the sun (or uranium atoms), directed, stored, bought, sold, used for work or wasted, and ultimately dissipated"[18] and distinguishes between somatic energy regimes which rely on the muscle power of human and non-human animals, and exosomatic regimes that use fossil fuels or uranium. Michael Niblett emphasizes the specifically social aspect of energy regimes, in which energy sources are understood not as static inputs "but as simultaneously structured and structuring relations of the patterned totalities of historical systems."[19] In this chapter, I argue that the toxic imaginaries of post-Soviet post-apocalyptic fictions such as *Metro 2033* are "energy forms"[20] that mediate the subjectivities, affects, and social relations corresponding to the exo-somatic energy regimes structuring "toxic modernity"[21] as experienced in post-Soviet Russia. The enduringly nuclear futures that they imagine "tell us more about the present than they do about the future," mediating the lived experiences and anxieties around energy transition and the asymmetries of nuclear regimes, and registering the difficulty of imagining post-nuclear organizations of human societies.[22]

I The Nuclear Uncanny

I begin by examining the imagination of catastrophic futurity in Dmitry Glukhovsky's *Metro 2033*, which turns on ecogothic revelations of a nuclear uncanny. *Metro 2033* is set in a post-apocalyptic Russia in the near future, twenty years after a global atomic war has turned the earth into a radioactive wasteland. The only human survivors are those who happened to be underground in the Moscow metro during the missile strikes, and a complex subterranean society evolves amongst the 70,000 inhabitants of the subway. Moscow, instead of New York or London, functions as an apocalyptic metonym for the annihilation of the world. The geopolitical causes of the atomic war are never revealed; the event happens offstage, its causality receding ever further from memory in the consciousness of the survivors who are immersed in a state of permanent war, fighting for water, food, ammunition, and fuel; conducting wars over ideological differences between factions of Stalinists, Trotskyists, free market fundamentalists, and religious cultists; and combatting waves of mutated creatures and psychic disturbances.

This world is distinctly ecophobic, brimming with representations of weirded nature in the tunnels and abandoned ranges where "the radioactive earth, disfigured by thousands of explosions, ploughed with trenches and pitted with catacombs, put forth monstrous sprouts."[23] The novel's protagonist, Artyom, is orphaned after a "living torrent" of mutated rats overruns his station, devouring everything in their path with a force "beyond human comprehension."[24] If in Andrei Tarvosky's film *Stalker*, one of Glukhovsky's inspirations for the novel, the eerie Zone into which the protagonist ventures is a space of mystic immanence invested with libidinal power, embracing rather than ruing the radical contingency of the objective natural world, in *Metro 2033*, irradiated environments are portrayed as zones of infernal alienation, whose excrescent fecundity threatens the survival of civilization, a nature that has exceeded human control. Artyom perceives the city of the Dark Ones in nuclear tropes that cast its organic structures as cancerous mutations:

> A huge path had formed right in the middle of the Gardens, as if even the trees had drawn back in disgust from an unseen evil. It was a strange and repulsive sight: a large city like a gigantic life-giving organ, pulsing and quivering, that stretched out for several square kilometres. The sky gradually was being painted with morning colours, and this terrible tumour was becoming ever more visible: a living membrane entangled with veins, tiny black figures crawling out of cesspool exits.[25]

The symbolic opposition of Artyom's home station of *VDNKh*, site of the Soviet-era Exhibition for the Achievements of the National Economy, and the Botanical Gardens where the Dark Ones live emerge sets up a Cartesian dualism between culture and nature. The scientistic modernity of human technology and political economy is opposed to the post-apocalyptic nature of a forest gone feral, escaping the bounds of arboriculture.

Throughout the novel, multiple characters articulate Hobbesian visions of a catastrophic futurity in which human culture is failing to hold back the tide of a frenzied nature, drawing a sharp divide between what is conceived as human and as non-human. They invest the swarming life of nuclear nature with a terrifying alterity, couched in neo-Darwinian rhetoric of a battle for species survival against "strange, freakish, and dangerous creatures, the likes of which might well have brought Darwin himself to despair with their obvious lack of conformity to the laws of evolutionary development", which have been "reborn under the invisible and ruinous rays of sunlight, turned from inoffensive representations of urban fauna into the spawn of hell."[26] The novel's nuclear uncanny revolves around a return of the repressed in which evolution itself is imagined as a revenge that threatens to replace *homo sapiens* with a new species in retribution for the atomic destruction of the earth.

As Sukhoi bitterly exclaims, the rise of the Dark Ones, whom he calls *Homo Novus* represents the decline of human mastery of nature: "Surrender, Homo sapiens! You are no longer the king of nature! You've been dethroned! […] Evolution, the laws of which you understood, has already created its new branch, and you are no longer the latest stage, the crown of creation."[27]This challenge to anthropocentrism is a source of profound anxiety, rather than an inspiration to imagine new forms of multi-species cohabitation. Sukhoi mocks hopes that "the levels of radiation would lower, and people could return the surface again" as a postlapsarian fantasy of return to pre-atomic nature, and similarly dismisses the suggestion that "the underground is now our natural habitat" (40), arguing that humans have become as "pale and sick as Wells' Morlocks" from dwelling underground, subsisting on a meagre diet comprised entirely of mushrooms cultivated with human dung and pork from pigs fed on funghi. However, he can propose no other form of life beyond the conquest of nature; his declensionist warning is circumscribed in melancholy for the loss of species dominance: "We aren't at home there on the surface anymore. The world doesn't belong to us anymore."[28]

This Spenglerian scenario of "world-dissolution" can be read allegorically as a national structure of feeling encapsulating post-imperial nostalgia for Soviet hegemony over nature, couched in the "exhausted imagination of a dying class" that compensates for "the cancelled future of a vanished colonial and imperial destiny" by "intoxicat[ing] itself with images of death."[29] Indeed, Ulrich Schmid argues that "the homelessness of the post-apocalyptic hero corresponds to the dominating self-perception of [post-Soviet] Russian society."[30] However, the profound sense of unworlding in Sukhoi's monologue can also be interpreted as the ecological unmooring of humanity-in-nature, the novel's prolepsis of "the end of cheap nature," Jason W. Moore's phrase for the ecological crisis produced by tendency of capitalism to appropriate energy, raw materials, and the food produced through the work of both human and extra-human natures as a source of unpaid surpluses to increase the productivity of its accumulation regime, without acknowledging biophysical limits.[31] The Metro as giant air-raid shelter at first seems to offer a fantasy of the "cheap nuclear": of nuclear endurance without ecological consequences or costs, where humans magically bypass famine induced by the mass death of crops and livestock and the poisoning of water and air. Yet, their subterranean environments are organized around unsustainable monocultures, wholly lacking in biodiversity. Their late modernity is truly a "toxic modernity" in Joseph Masco's sense, where "toxicity and alienation are the perverse conditions for modern subject formation in a world shaped by synthetic chemicals."[32] If humans "are creatures constituted by radiation, solar and otherwise,"[33] the station dwellers are cut off from the sustaining vitality of solar energy, grown "thin and pale" and fearful of the "searing rays of the sun."[34] They are both physically and psychically dispossessed, prone to etiolation, chronic depression and paranoia. Their ecological regime is on the verge of absolute exhaustion, dependent on dwindling relics of exosomatic regimes: canisters of petrol scavenged from the surface, plastic bottles of synthesized multivitamins. Human culture, clinging tenuously to a tattered web of life, is subject to contraction of the plenitude once promised by capitalist modernity: stations are lost, parts of the grid gutter into darkness, tools break, resources dwindle, even language begins to disappear as the sensuous totality of external nature diminishes.

The Metro society's survival focuses on replicating the technics of the capitalist production of nature, but does not imagine how to *live differently*, unable to think of how to increase the diversity of life, reverse ecological degradation, or adapt to the altered ecologies which surround them. They remain trapped in Malthusian conceptions of scarcity and social Darwinist ideas of perennial struggle over resources, unable to conceive an equality that "facilitates the coexistence of manifold forms of being—human, non-human, and post-human—and their various attachments to ecosystems in the world without placing these in hierarchies."[35] Their future is enduringly nuclear, but it is no longer one of perpetual expansion or limitless growth, but rather haunted by recursion and regression. The novel's concludes with a nuclear missile detonation, which follows the original atomic war's planetary ecocide with a second holocaust of the new forms of irradiated nature that have emerged on the surface: "A pitch-black cloud shot upwards, new explosions circled him from all sides and the city crashed down, emitting a tired, dying moan. It was clouded by the thick smoke of the burning forest. From the sky more missiles fell, and each death reverberated with a melancholy pain in Artyom's soul."[36] This tragic repetition not only fails to imagine a post-nuclear energy future, but conceives futurity in terms of doubled, compounded nuclear catastrophe.

The catastrophic future of *Metro 2033* is thus enduringly nuclear in two senses: as weaponry and as energy. The metro itself, transformed into a giant air raid shelter, is illuminated by scarlet emergency lights powered by secret reactors, suggesting a zombified endurance of the infrastructure of nuclear energy, long after the collapse of the Russian nuclear state. The diurnal distinction between day and night collapses in the perpetually illumined stations, and dwellers depend on giant electric clocks, "considered to be as important as strategic objects like the arms store, the water filters and the electric generator," to tell them when to sleep, their circadian rhythms unmoored from solar time.[37] The total dependency of the Metro dwellers on electricity-powered illumination—to be cut off from power is literally to become powerless, plunged into darkness and death, the greatest horror of every station dweller—can be read as an ecogothic assertion of the energy unconscious of a post-Soviet society "addicted" to electricity, unable to relinquish the assumption that "a standing reserve of energy" will always exist.[38]

This is "gridlife dependency" in its starkest form, exaggerated by the novel's setting in a wholly-constructed environment that is irrevocably cut off from solar energy, paradoxically dark, though perpetually electrified.[39] The solipsism of its Moscow setting, in which the finitude of the energy regime is portrayed as tragic loss, and where the irradiated natures produced by past atomic disaster are cast as externalized enemies, can also be seen as a return of the repressed reality of nuclear immanence throughout the rest of the former U.S.S.R., come back to haunt the post-imperial metropole. What is portrayed as apocalypse for the near-future Muscovites is the energy present of real-life populations from the Urals to the Caucasus to the Ukraine, left to inhabit "disabling environments" toxified by uranium ore extraction, nuclear fuel recycling, waste processing and disposal, and power plant disasters such Kyshtym and Chernobyl.[40] For these people, radiation and toxicity are immanent to their daily lives, not perverse externalities, but rather embedded in their very bodies as disease and cellular mutation. In this sense, Sukhoi's admonition that "The future is behind them!" can be read not only as the fear that Russia's greatest achievements lay in its pre-catastrophic past, but as an unconscious reflection on the way in which the overriding sense of loss associated with the imagined future says something about what the novel does not or cannot portray: the hidden costs of Russia's nuclear past and present.

Significantly, the novel's metro setting draws on historical fact. As Glukhovsky has explained in interviews, his inspiration for the novel arose from revelations during perestroika that the Moscow subway was the "world's biggest nuclear shelter," equipped with hermetic doors to seal it off in the case of nuclear attack, and supplied with Artesian wells and air filters to cleanse nuclear contamination.[41] Even more *unheimlich*, a second, hidden subway, the Metro-2 system, was constructed alongside the first, a labyrinth of secret stations beneath the Kremlin, the ministries, the university, the Lenin library, and the army headquarters, with the intention of preserving not only the *nomenklatura* and security services, but the intellectual and scientific elites: "The metro actually has two separate lines – one for common people and one for the rulers and the elite. And this was quite a shock to me. […] You're riding through a subway tunnel, you see a little door, and behind it is a small tunnel, which leads to this huge [bunker[, 7-8 thousand square meters."[42] A large part of the novel's gothic effect derives from revelation of this hidden reality of the city, the nuclear uncanny of the Soviet past expressed in a secret infrastructure that routinizes the prospect of nuclear annihilation and instant mass death. It is the potential deathworld beneath the surface of the everyday, the physical manifestation of the "new social orientation toward death" which underlies "atomic health" in nuclear modernity, "both normalized and rendered invisible as a new form of nature."[43] Just as the Metro-2 architecture lingers into the post-Soviet era like a phantom skeleton undergirding the political, cultural, scientific, and military apparatuses of the city, so too do the "nuclear effects" of energy regimes persist into the twenty first-century, when the threat of nuclear destruction seems to have waned in political consciousness, but the weapons systems, ore and waste processing plants, and reactors of the industry remain undismantled, disclosing an "inability to think beyond these atomic potentialities—let alone to reduce the technological, political, and environmental conditions that continue to support them."[44] The "nuclear nature" of the underground is rooted in fundamental class asymmetries and an "instrumental calculus of death" where human life is divided into those who are valuable and whose health is worth 'securing' in the specialized Metro-2 system, and the surplus population whose relationship to the state is mediated by catastrophic risk. [45]

Artyom's odyssey through the underworld of the Metro civilization is a kind of dark tourism, which imagines the underground city not as a site of carnivalesque, erotic possibility, but rather as a necropolis animated by auditory spectres of the nuclear dead. Artyom possesses a special "supersensitivity" that enables him to read the changing aura of the subway by "listening to the tunnel."[46] Throughout his travels, he has hallucinatory epiphanies in which inanimate objects take on life and his consciousness expands to take in the totality of the underground environment:

> The flowing sounds from that pipe seemed to him the same as ether, slowly extending along the tunnel, […] Suddenly it seemed to Artyom that he was standing on the threshold of an understanding of something important as though the last hour he had spent wandering in the pitch-black darkness of the tunnels and in the twilight of his own consciousness had pulled the curtain of this great mystery slightly to the side, separating all rational beings from a knowledge of the true nature of this new world.[47]

Other explorers experience this psychic noise as "tunnel horror,"[48] a madness that breaks their minds as they cling to reason, like the siren songs lashing the sailors of the Odyssey, which Horkheimer and Adorno read as nature's immanence confronting the "identical, purpose-directed, masculine character" of the rational ego.[49] By contrast, Artyom abandons himself to prophetic intuition and allows his subjectivity to dissolve into the wider sensorium, opening himself to the manifestations of the repressed reality of nuclear nature. At the end of the book, this extra-sensory telesthesia is neatly explained as the attempts of *Homo Novus* to communicate telepathically. However, it can also be interpreted as the perception of catastrophic events and temporalities beyond the normal ranges of empirical senses, recalling anthropologist's Sarah D. Phillips description of "Chernobyl's sixth sense," an "ever-present awareness" that haunts those who share the experience of nuclear disaster, rupturing history into life *before* Chernobyl and life living *through* Chernobyl's still unfolding catastrophe.[50]

In Artyom's hallucinations, time and space are subject to curious expansions and contractions when he passes through particularly toxic or irradiated tunnels where mass deaths have occurred. This temporal relativity evokes the relatively short durée of individual human life against the longue durées of radioactive half-lives, invisible and seemingly impossible to perceive, yet everywhere shaping the Metro environment. The mystical Khan attributes the tunnel noise Artyom hears to the voices of the dead, emanating from all those killed since the original atomic event:

> How many megatons and bevatons does it take to disperse the noosphere? […] In our world the soul stays in the metro after death… It will rush around under the arches of these underground tunnels until the end of time because there isn't anywhere for it to go. […] We live amidst the souls of the dead, they surround us in a full circle.[51]

If the noosphere is the postulated sphere of evolutionary development dominated by human consciousness and interpersonal relationships, the nuclear destruction of the biosphere is here represented as having catalysed a profound rupture in the transpersonal constitution of human subjectivity. Here again is the nuclear uncanny, where the souls of the nuclear dead circulate through the infrastructure of the underground like the invisible particles of radioactive decay, impossibly animating the environment with reminders of catastrophic violence long after their physical deaths. Artyom's potential to bear witness poses him as a kind of Virgil of the Metro's underworld with the potential for *anamnesis*, the recollection of forgotten histories of violence; however, this testimonial capacity is held in tension with the text's conformity to gaming conventions, as I will examine in the next section.

II Nuclear Transmediality

The transmediality of nuclear culture, with its explicit origins in imperialist and capitalist institutions, offers a rich terrain for nuclear humanities criticism. The emergence of video games as a unique media is inseparable from nuclear modernity, generated from the same military research matrix that resulted in the Internet and personal computer. The very ability to play such games relies on the material infrastructures of military-industrial capitalism and on the energy regime that powers the devices on which games are played. Dyer-Witheford and De Peuter argue that "video games are a paradigmatic media of Empire—planetary, militarized hypercapitalism."[52] Digital games originated in cold war nuclear-age simulations, invented in the 1950s and 1960s by the bored programmers operating Pentagon military computers used to war-game missile trajectories. These hackers transformed the oscilloscope screens of nuclear war preparation into fantastic playgrounds on which to fire space torpedoes at imagined virtual enemies.[53] As the gaming industry developed in the second half of the century, nuclear scenarios were central to the plots and the aesthetics of many games, and were further influenced by the recruitment of Japanese *manga* and *anime* artists in the 1980s, cross-pollinating transnational subcultures shaped by nuclear events and regimes.

Manga is a cultural form that gained prominence among Japanese youth born in the era of post-nuclear reconstruction, a generation haunted by the sense of being "a new humankind" indelibly inflected by the trauma of Hiroshima.[54] Shaped by a post-traumatic, anti-authoritarian sensibility, manga was catapulted to a nationally significant genre with Keiji Nakazawa's iconic testimonial series *Barefoot Gen* (1973 to

1985), which narrated the story a six-year-old boy who survives the bombing of Hiroshima, loosely based on Nakazawa's own experiences as an 'explosion-affected person.' American comic Art Spiegelman describes the charged, feverish clarity of "comics after the bomb" as emanating "from something intrinsic to the comics medium itself and from the events Nakazawa lived through and depicted.[55] Similarly, the *anime* film *Akira* (1988) directed by Katsuhiro Otomo and based on Otomo's manga of the same name, wrestles with the horror and trauma of nuclear holocaust, depicting a tragic hero, Tetsuo, whose mutant psychic abilities trigger a big bang in an alternate universe. Twenty-first century popular culture continues to be saturated with transmedial imaginations of nuclear apocalypse, often in contradictory ways that demonstrate the testimonial power of forms such as *manga* and *anime* to grapple with the socio-ecological fallout of nuclear disaster, but which also revel in fantasies of nuclear empowerment and mutant creativity, as in the ideological apparatuses of video games that reinforce the subjectivities of "worker-consumer and soldier-citizen."[56]

Metro 2033 is a paradigmatic example of the transmediality of nuclear culture in its serialized online composition and distribution across multiple media platforms, and of intermediality in its transnational allusions to other nuclear video games, films, and fiction. After the first version of the novel was rejected by publishers, Glukhovsky turned to the Internet, posting each chapter on LiveJournal and conducting interactive "literary beta-testing" to gauge reception and recalibrate plot elements and world-building according to reader feedback.[57] Fans protested unhappy or mystical endings in which Artyom died or was dissolved into the collective consciousness of the Homo Novus rather than commit ecocide; thus Glukhovsky revived the 'hero' and allowed him to consummate his tragic quest to fire nuclear missiles against the peaceful species. Much of the online feedback was orientated towards the fine details of weapon fetishism and techno-military idolatry corresponding to first person shooters: what calibre of ammo is used by a sniper weapon, why a flamethrower can't be used in a tunnel, despite the fact that little shooting actually takes place in the novel, compared to its game adaptation.[58] The resulting text was a more mainstream product calibrated for a market of readers influenced by the ideological conventions of gaming, diluting plot elements that interfered with their capacity to project themselves onto a cipher-like action hero. The finalized form of the novel, published by EKSMO, was a bestseller, selling over 500,000 copies in Russia alone, and was developed into a video game by *4A Games* in 2010.[59]

In interviews, Glukhovsky has attested that the novel was heavily influenced by his "passion" for playing the first *Fallout: A Post Nuclear Role Playing Game* (1997) from Interplay Entertainment, an open world RPG with a post-apocalyptic setting in an alternate-history version of the mid-twenty-second century, where the world has been destroyed by a nuclear war incited by inter-state energy wars over the last of the non-renewable commodities, oil and uranium. The player's avatar, a Vault Dweller miraculously preserved from radiation damage, is tasked with exploring the

Wasteland, littered with remnants of technology from the cataclysmic war and teeming with mutated creatures, in search of a Water Chip, in order to save the other inhabitants of the Vault.[60] The *Fallout* series' retrofuturist aesthetics create "an ironically safe space" to explore contemporary anxieties about nuclear technology through the simulation of Cold War environments, inscribing the tension between a critique of the glorification of atomic weapons and the ludic pleasures of nuclear power into the gameplay, and reinforcing ideologies of Malthusian competition over scarce resources.[61]

The novel's serialized composition on LiveJournal invited feedback that encouraged readers to treat the world of *Metro* as a RPG which they could explore and adjust to their liking. Structured around a central quest akin to a game's main quest arc, the text's narrative translates the formal structure of the RPG into novel form; it is not strongly plot-driven, but rather more episodic, reflecting the linear, bead-on-a-string structure of many video games as it passes from station to station, encountering different environments in each. Its world-building privileges atmosphere over content, reflecting the emphasis on immersion typical of open-world games. However, it offers a bleaker, more ecogothic version rooted in survival horror, replacing the "Raygun Gothic" pop art and 1950s nostalgia of *Fallout* with brooding, black tunnels and philosophical contemplations. Its simplistic character development revolves around two basic archetypes, the rugged survivalist and the mystic seer, which conjoin *Fallout*'s lone Wanderer with the figure of the "stalker" appropriated from Arkady and Boris Strugatsky's 1971 science fiction novel *Roadside Picnic* and reimagined in Andrey Tarkovsky's 1979 film *Stalker.*

Strugatskys' novel is set in a post-visitation world, where aliens have left behind six Zones full of mysterious objects that defy the laws of physics. The "stalkers" are hardy adventurers who scavenge for artifacts in the dangerous Zones; their name, an Anglicism borrowed from Rudyard Kipling's "Stalky" stories (1899), has an imperialist provenance, invoking the Victorian adventure novel. Tarkovsky reinvented his Stalker as a mystical guide on an anguished search for spiritual knowledge in a sentient Zone. Famously shot in the toxic ruins of power plants and chemical factories in Tallin, the film created an indelible image of a contaminated ecology littered by decaying human debris, which would haunt the Soviet nuclear imaginary like a spectre of the future, an uncanny prolepsis of the zone of restriction which would surround Chernobyl. As Žižek comments, for ex-citizens of the Soviet Union, the notion of a "forbidden Zone" gives rise to multiple associations: as gulag of prisoners or secluded domain of the *nomenklatura,* but also as "a territory poisoned or otherwise rendered uninhabitable by some technological (biochemical, nuclear...) catastrophe, like Chernobyl." [62]

In the video game *S.T.A.L.K.E.R.: Shadows of Chernobyl*, released by Ukraine developer GSC Game World in the same year as the print publication of *Metro 2033*, the Zone would be explicitly reconfigured as the site of a second Chernobyl disaster, into which players venture in search of their identity whilst combating mutated creatures and animate objects. While the game features more than one ending, the allegedly "happy" conclusion requires the player not only to kill all his adversaries, but to destroy all the elements that contain the zone's consciousness, violently imposing his ego on the external environment in another version of the doubled catastrophe. If the Chernobyl exclusion zone has inspired real-life forms of "dark and toxic tourism"[63] that commodify sites of industrial death and disaster, video games like *S.T.A.L.K.E.R.* enable a virtual tourism, exploiting the libidinal pleasures of nuclear horror and imagining nuclear simulations not as traumatic environments of compound disaster, but rather as ludonarrative sandboxes where catastrophe is "reincorporated into the ordinary and thus available for comic play."[64]

Metro 2033 borrows heavily from Tarkovsky's metaphysical vision of toxic modernity, but transplants the zone into the heart of the imperial metropole, and inverts the sense of spiritual awe which Tarvosky's stalkers feel for the zone into an affect of survivalist horror more akin to the video game adaptation. Artyom, whose own name is derived from Artemis the hunter, romanticizes stalkers as conquerors of the weird nature of the surface,

> Every stalker became a living legend, a demigod, whom everyone, young and old, regarded with rapt amazement. In a world in which there was nowhere left to sail or fly, and the words 'pilot' and 'sailor' were becoming dull and losing their meaning, children dream of becoming stalkers. To strike out, clothed in shining armour […] climbing to the surface, to the realm of the gods, to do battle with monsters and, returning underground, to bring the people fuel, military supplies, light and fire.[65]

This reactivates an imperial imaginary for the post-Soviet era, casting the nuclear wasteland as a new frontier of wild nature to be conquered by heroic male explorers in their protective suits and gas masks; it draws heavily on the power fantasies of atomic health in *Fallout*, where the toxic effects of radiation exposure become a "element of ludo" that can be effortlessly overcome by wearing "power armour" and consuming Rad-Away.[66]

These fantasies are explicitly gendered, rooted in a world of exclusively homosocial relations and literally toxic masculinity. In both the novel and game versions of *Metro 2033*, there is a glaring absence of any speaking female characters. The only referenced female character is Artyom's dead mother, whose memory functions as an Oedipal consolation when his existential homelessness becomes overwhelming. The nuclear power fantasy is also explicitly racialized in the *Metro* novel and games. A defining feature of the Dark Ones is their black skin and alleged animality; the word used in Russian is *Chernye*, or "Blacks." Artyom is haunted by post-traumatic dreams of them marching on the barricade at *VDNKh*, "naked, covered in black glossy skins, with huge eyes and mouths like gashes," emitting a "howl like a requiem."[67] Characters throughout the novel describe *Homo Novus* as dehumanized monsters, speculating that they are mutants, cannibals, vampires, carrion-eaters, vermin, or undead; one particularly vituperous soldier calls them "black bitches," combining misogyny and racism.[68] The invasion of an alien Other is central to the form of the video game since its inception, naturalizing the mutant-as-enemy in order to provide an ludonarrative justification for "murder simulation"; consequently, many first person shooters are imbricated with ideologies of popular nationalism and ethnic purity. At first glance, the xenophobic, racialized imagination of the Dark Ones in *Metro 2033* seems to accommodate such conventions without friction, particularly when invoked alongside allusions to the ethnic difference of Chechens and Georgians, inviting their interpretation as modern "enemies" threatening post-Soviet Russia. However, the conclusion of the novel denaturalizes this ideology, subverting what had previously been the consolatory pleasures of demonizing alterity.

Glukhovsky describes himself as a humanist, arguing that *Metro 2033* is meant to criticize the resurgence of popular nationalism and white supremacy in post-Soviet Russia, particularly during the wars in Chechnya and the Caucasus for strategic dominance of oil-rich central Asia: "The biggest discovery I have made [...] in observing what is happening in Russia, was the sudden need for an enemy. Both an internal enemy and an external one as well." He attributes this invention of enemies to a compensatory mechanism of Russia's post-imperial "complex": "Russians used to be a part of a huge empire […] We are facing the after effects of a war that we lost. […] And so there is a great need to restore this subjective feeling of superiority."[69] Within this context, the post-apocalyptic quest of Artyom must be interpreted dialectically, not as a heroic imperial adventure to eliminate ethnic Others who are disturbing the purity of the Russian underground civilization, but as a picaresque "tale of xenophobia" which turns on the decision of a naïve young man with a gun, indoctrinated by fantasies of masculinist, racialized violence, "to fight or not fight the Dark Ones."[70] Literary critics have similarly characterized post-Soviet culture as riven by a crisis of national subjectivity, stemming "from the loss of the identifiable enemy" after the end of the Cold War.[71] Daria Kabanova argues post-apocalyptic texts "are actively searching for a new other (or others), against which a renewed national identity can be constructed," and that the hybrid 'manimals' of Tatyana Tolstaya's *The Slynx* attempt to negotiate a way around the dichotomies of negative identity formation by "turning to the ultimate other available to the human species, the animal."[72] In *Metro 2033*, a similar function is performed by the imagination of the Dark Ones: the strictly negative dichotomies in which they are initially portrayed (of race, colour, animality, inhumanity, natural immanence, etc.) are blurred by the conclusion, collapsing the protagonist's own epistemic basis for his subjectivity and leading him to question the dualisms through which he has conceived his post-nuclear environment.

The novel's erasure of the causality of the original atomic war seems emblematic of the loss of "political-historical agency" that characterizes many twenty-first century post-apocalyptic novels, in contrast to "the nuclear apocalypses that dominated the Cold War imagination of the future, [in which] agency is retained always in the spirit of an urgent but still-timely warning: living in the present, rather than the scorched and radioactive future, we can choose not to build the last bomb and choose not to push the button that will launch it."[73] However, the spectre of agency is resurrected by the novel's final plot twist, which ironizes Arytom's decision to launch the remaining missiles of the Moscow arsenal against the Dark Ones, annihilating their hive city and razing the teeming forests of the Botanical Gardens. Only after he has triggered the countdown does he discover that the Dark Ones—or the "Commoners" as they refer to themselves in the collective—are a post-human species whose telepathic attempts to establish communication with humanity were intended to establish multi-species solidarity.

When Artyom sees through the Others' eyes for the first and last time, he is consumed with a sense of mutual affinity and wonder at the beauty of their adaptation to nuclear nature:

> Having disappeared into the gaze of the dark one, he suddenly saw the universe with its eyes. New life was being reborn and hundreds and thousands of individual minds were being joined together into a single whole. . . The resilient black skin allowed the dark one to endure both the scorching sun and the January frosts, the soft telepathic tentacles enabled it to caress any creation and to painfully sting an enemy, and it was totally immune to pain…….[74]

Artyom's strange perceptual power can be understood as the registration of nuclear immanence in his own body and subjectivity, fundamentally altered by habitation of a post-nuclear environment; in this sense, he is as much as a post-nuclear creature as the Commoners he had previously imagined as fundamentally Other. Radiation, after all, "knows no boundaries, either political or biological."[75] His final epiphany is that he is not "chosen one" in the sense that he thought he was: not a messianic soldier-citizen destined to eliminate a Manichean enemy, but rather a medium for voices, of the human dead and of the soon-to-be-dead post-human, a channel for communication between species. The Commoners offer an alternative vision of a nature-society founded in collective co-habitation instead of individual dominance, within a shared eco-system conceived as a web of life in which everything is connected: "He understood that there was nothing dividing people and the dark ones. He understood they were not competing for survival but were two organisms intended by nature to work together."[76] Tragically, however, Artyom is unable to think beyond what Kamau Brathwaite has called the "missilic" consciousness of mass destruction until it is already too late.[77] As Glukhovsky comments, this ending refashions Polish writer Stanislaw Lem's cold-war novel *Solaris* (also adapted into a film by Tarkovsky): "They're offering a new symbiosis to the humankind and instead man destroys them with bombs."[78]

Metro 2033 thus consciously subverts many of the gaming conventions incorporated in its plot: the epic hero's quest to destroy the one true evil, the missilic imagination, the white, male imperial gaze, the power fantasies and "strong man" myths, the Manichean enemy figure as racialized Other, the Cartesian binary of nature versus culture, the privileging of action over feeling, the stalkers motivated by a "hypertrophic instinct for self-preservation."[79] However, in concluding with nuclear destruction, the novel invokes a nuclear fatalism that deterministically assumes a doomed world, raising the utopian prospect of a symbiotic ecological commons, only to contain and destroy it. Even the idea of the evolution of a posthuman species that can effortlessly tolerate radiation is a form of wish-fulfilment, which imagines evolution as 'fixing' the problem of toxification of environments. The novel's imagination of an enduringly nuclear future represents a failure to "demilitarize the mind",[80] a blockage of the capacity to think beyond the nuclear imaginary to pose "an entirely new kind of nature."[81] It suggests that post-Soviet Russian fiction remains in a "state of toxic suspension,"[82] employing categories of terror and post-apocalypse to perceive the future, rather conceiving new forms of political action and social organization. However, this failure can be partially recuperated through a dialectical reading of *Metro 2033*'s transmediality. Sven Cavalcanti argues that the post-apocalyptic video game "is about a lost world, not about an averted world. It displays nightmare fantasies that already exist"[83] and as such, demands the player to anticipate the destructive tendencies of their existing societies: "Like no other cultural domain, computer games insists on the world being a hostile place that is by no means a favourable location to live in—nowhere else is the future definitively labelled as abortive."[84] *Metro 2033* is thus exemplary of the representational limits of the post-catastrophic futurity bound up with the "Chernobyl model" of post-Soviet fiction that employs fantastic or speculative aesthetics to depict enduring nuclear disaster. The novel is simultaneously constrained by and subversive of genre conventions, in danger of fostering an apocalyptic fatality that promotes political paralysis, yet also prompting the reader/player to recognize that ecological catastrophe and contaminated nature are not merely end-time scenarios of virtual worlds, but are the daily routine of their own present, where the materiality of the nuclear is already immanent.

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[1] Alexeivich, *Voices from Chernobyl,* 124.

[2] Borenstein, "Dystopias," 88.

[3] English translations of titles from Schmid, "Post-Apocalypse," 4.

[4] Ibid., 4.

[5] Nixon, *Slow Violence*, 6.

[6] Petrocultures Research Group, *After Oil*, 55.

[7] Deloughrey, "Radiation Ecologies," 475.

[8] Masco, "Atomic," 340.

[9] Hecht, "Nuclear Ontologies," 258.

[10] Pomper, "Russian Nuclear," 2.

[11] Flisfeder, "Nuclear 1," 243.

[12] Josephson, *Red Atom*, 5.

[13] WISE Russia, "The End of Russian," 2.

[14] Costlow and Nelson, *Other Animals*, 195.

[15] Borenstein, "Dystopias," 88.

[16] Schmid, "Post-Apocalypse," 5.

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[17] Penzin, "Russia," 305.
[18] McNeill, *Something New,* 297.
[19] Niblett, "Energy Regimes," 137.
[20] Clarke, *Energy Forms,* 1.
[21] Masco, "Fallout,"159.
[22] Petrocultures Research Group, *After Oil*, 63.
[23] Glukhovsky, *Metro 2033*, 30.
[24] Ibid., 8.
[25] Ibid., 454.
[26] Ibid., 9.
[27] Ibid., 37.
[28] Ibid., 36.
[29] Jameson, Fredric, "Progress," 152.
[30] Schmid, "Post-Apocalypse," 4.
[31] Moore, *Capitalism,* 291.
[32] Masco, "Fallout," 158.
[33] Deloughrey, "Radiation Ecologies," 468.
[34] Glukhovsky, *Metro 2033*, 5.
[35] Petrocultures Research Group, *After Oil*, 64.
[36] Glukhovsky, *Metro 2033*, 458.
[37] Ibid., 45.
[38] Petrocultures Research Group, *After Oil*, 56.
[39] Ibid.
[40] Carrigan, "Postcolonial Disaster," 255.
[41] Glukhovsky, "Interview," n.pg.
[42] Ibid.
[43] Masco, "Atomic," 338.
[44] Ibid., 339.
[45] Ibid.
[46] Glukhovsky, *Metro 2033*, 89.
[47] Ibid., 90.
[48] Ibid., 111.
[49] Horkheimer and Adorno, *Dialectic*, 26.
[50] Phillips, "Chernobyl's Sixth Sense," 159.
[51] Glukhovsky, *Metro 2033*, 111.
[52] Dyer-Witheford and De Peuter, *Games of Empire*, xxix.
[53] Ibid., xv.
[54] Yoshimi, "Consuming 'America,'" 210.
[55] Spiegelman, "Barefoot Gen,"i.
[56] Dyer-Witheford and De Peuter, *Games of Empire*, xxix.
[57] Garratt, "Interview," n.pg.
[58] Glukhovsky, "Interview," n.pg.

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[59] Glukhovsky now sponsors a massive personal book publishing program where independent authors apply to create *Metro* sequels set in a cross-translatable universe around the world.

[60] Glukhovsky, “Interview,” n.pg.

[61] Rowan, Derrick. “Destroying Yesterday's World,” 4.

[62] Žižek, “The Thing,” 227.

[63] Yankovska and Hannam, “Dark and Toxic,” 929.

[64] Palmer, “Ordinary Catastrophes,” 16.

[65] Glukhovsky, *Metro 2033,* 30.

[66] Podzerac-Chenevey, “A Direct Link,” n.pg.

[67] Glukhovsky, *Metro 2033,* 24.

[68] Ibid., 455.

[69] Glukhovsky, cited in Ieshchenko, “Russians,” n.pg.

[70] Glukhovsky, cited in Garratt, “Interview,” n.pg.

[71] Kabanova, “The Animal,” 220.

[72] Ibid.

[73] Canavan, “Introduction,” 4.

[74] Glukhovsky, *Metro 2033,* 456.

[75] Costlow and Nelson, *Other Animals*, 14.

[76] Ibid.

[77] Brathwaite, “Caribbean Culture,” 9-54.

[78] Glukhovsky, “Interview,” n.pg.

[79] Glukhovsky, *Metro 2033,* 37.

[80] Masco, “Atomic Health,” 351.

[81] Ibid.

[82] Masco, “Fallout,” 161.

[83] Cavalcanti, “Preconscious Capitalism,” 139.

[84] Ibid.

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